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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,212	10/15/2003	Russell Hudyma	01641/000M735-US0	7256

7278 7590 05/10/2004

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EXAMINER

THOMAS, BRANDI N

ART UNIT	PAPER NUMBER
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2873

DATE MAILED: 05/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/688,212	HUDYMA ET AL.	
	Examiner	Art Unit	
	Brandi N Thomas	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 20-30 is/are rejected.
- 7) ☒ Claim(s) 17-19 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0401</u> . | 6) <input checked="" type="checkbox"/> Other: <u>Detailed Action</u> . |

DETAILED ACTION

Information Disclosure Statement

1. Acknowledgement is made of receipt of Information Disclosure Statement(s) (PTO-1449) filed 10/15/03. An initialed copy is attached to this Office Action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-16 and 20-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Omura (6606144 B1) in view of Schuster (US 2003/0048547 A1).

Regarding claim 1, Omura discloses a projection lens, in figure 2, having an object plane (A) and an image plane (B) and comprising objectwise to imagewise: a first lens group (G1) having negative refractive power; a second lens group (G2) having a positive refractive power; a third lens group (G3) having a negative refractive power; fourth and fifth groups (G4 and G5) having overall positive refractive power (col. 12, lines 65-67 and col. 13, lines 1-7); the projection lens having a numerical aperture of at least about 0.85 (col. 29, line 37), and wherein the projection lens has a 1 1/2 waist construction with a 1/2 waist (indent including lenses L17 and L18) being defined in the first lens group (G1) and a primary waist (indent including lenses L26 and L27) being defined in the third lens group (G3) (figure 13) (col. 32, lines 66-67 and col.

4, lines 1-4) except that it does not show a sixth lens group. Schuster shows that it is known to provide a sixth lens group for maintaining a distance between the projection plane and the image plane of 1000 mm (section 0023). Therefore it would have been obvious to someone of ordinary skill in the art at the time the invention was made to combine the teaching of Omura with the sixth lens group of Schuster for the purpose of maintaining a distance between the projection plane and the image plane of 1000 mm (section 0023).

Regarding claim 2, Omura discloses, in figure 2, a projection lens, wherein each of the lens elements in the third lens group (G3) has a negative refractive power (col. 12, line 67 and col. 13, line 1).

Regarding claim 3, Omura discloses, in figure 2, a projection lens, wherein each of the lens elements in the fourth lens group (G4) has a positive refractive power (col. 13, line 1).

Regarding claim 4, Omura discloses, in figure 2, a projection lens, wherein the fifth lens group (G5) has at least five lens elements (L51-L57) with at least four lens elements (L52-L57) in the fifth lens group having positive refractive power (col. 18, 23-29) (figure 1).

Regarding claim 5, Schuster discloses, in figure 2, a projection lens, wherein a most object forward lens element of the first lens group (LG1) has strong positive refractive power which in part defines the $\frac{1}{2}$ waist (indent beginning with L%) in the first lens group (LG1) (section 0024).

Regarding claim 6, Omura discloses, in figure 2, a projection lens, wherein the first lens group (G1) has more lens elements with negative refractive power than lens elements with positive refractive power (col. 18, lines 1-5).

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Regarding claim 7, Omura discloses, in figures 1 and 13, a projection lens, wherein a conjugate aperture stop (AS) is located between the fourth lens group (G4) and the fifth lens group (G5) (col. 17, lines 65-67).

Regarding claim 8, Omura discloses, in figure 2, a projection lens, wherein the projection lens includes at least six aspheric surfaces (ASP1-ASP6) (col. 16, lines 10-20).

Regarding claim 9, Schuster discloses, in figure 2, a projection lens, wherein the first six object forward lens elements (L1-L6) are free of convex aspheric surfaces (sections 0024 and 0025).

Regarding claim 10, Schuster discloses, in figure 2, a projection lens, wherein a diameter of each of the first five object forward lens elements (L1-L5) is about equal to a diameter of the object plane (O).

Regarding claim 11, Omura discloses a projection lens, wherein a Ca/Cb ratio of less than 1.60 is maintained on convex aspheric surfaces that are associated with either one of the two most object forward lens elements of the system (col. 2, lines 58-62 and col. 2, lines 1-5).

Regarding claim 12, Omura discloses a projection lens, wherein a Ca/Cb ratio of less than 2.35 is maintained on convex aspheric surfaces that are associated with either the third or fourth most object forward lens elements (col. 3, lines 54-58 and 67).

Regarding claim 13, Omura discloses a projection lens, wherein a first or second most object forward lens element has a concave aspheric surface and a Ca/Cb ratio is maintained at greater than or equal to about 0.70 (col. 2, lines 58-67).

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Regarding claim 14, Omura discloses a projection lens, wherein a third or fourth most object forward lens elements has a concave aspheric surface and a Ca/Cb ratio is maintained at greater than or equal to about 0.45 (col. 3, lines 54-61).

Regarding claim 15, Omura discloses a projection lens, wherein negative refractive power is concentrated in a 1/2 waist (indent including lenses L17 and L18) formed in the first lens group (G1) and a primary waist (indent including lenses L26 and L27) formed in the third lens group (G3) (figure 13) (col. 32, lines 66-67 and col. 4, lines 1-4).

Regarding claim 16, Schuster discloses a projection lens, wherein the fourth and fifth lens groups are free of lens elements that have aspheric surfaces (section 0026).

Regarding claim 20, Schuster discloses a sixth lens group (LG6) but does not specifically disclose the sixth lens group including at least one aspheric surface. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include an aspheric surface for the purpose of reducing spherical aberration.

Regarding claim 21, Omura discloses the claimed invention except for the numerical aperture being at least about 0.92. It would have been obvious to include an aperture with a numerical value of about 0.92, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include an aperture with a numerical value of about 0.92 for the purpose of further limiting the diameter of the light allowed to pass through the lens.

Regarding claim 22, Omura discloses, in figures 1 and 2, a projection lens having an object plane (A) and an image plane (O) and comprising objectwise to imagewise: a first lens

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group (G1) having negative refractive power; and at least three other lens groups (G2, G4, and G5) having a positive refractive power and at least one other lens group (G3) having a negative refractive power (col.12, lines 65-67 and col.13, lines 1-7) and the first lens group (G1) includes a 1/2 waist construction (indent including lenses L17 and L18), while a primary waist (indent including lenses L26 and L27) is defined in the at least one other lens group (L3) except for wherein the six most object forward lens elements are free of aspheric convex surfaces. Schuster discloses the six most object forward lens elements are free of aspheric convex surfaces for allowing a greater diameter of light to pass through the lens (section 0024). Therefore it would have been obvious to someone of ordinary skill in the art at the time the invention was made to combine the teaching of Omura with the lens free from aspheric convex surfaces of Schuster for the purpose of allowing a greater diameter of light to pass through the lens (section 0024).

Regarding claim 23, Omura discloses, in figure 2, a projection lens, wherein the lens includes at least 25 lens elements (L11-L57) and at least six aspheric surfaces (L11, L12, L23, L24, L33, L56) (col. 18, lines 1-29).

Regarding claim 24, Omura discloses, in figure 2, a projection lens, wherein the projection lens has a numerical aperture of at least about 0.85 (col. 29, line 37).

Regarding claim 25, Schuster discloses, in figure2, a projection lens, wherein at least one other lens group (LG2) includes at least four lens elements (L6-L8 and L10) that each has a negative refractive power (section 0025).

Regarding claim 26, Omura discloses the claimed invention except for a third lens element having a negative refractive power. It would have been obvious to someone of ordinary

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skill in the art at the time the invention was made to include third lens with a negative power for the purpose of permit further divergence of parallel light.

Regarding claim 27, Omura discloses, in figure 2, a projection lens that includes at least 25 lens elements (L11-L59) except for at least nine aspheric surfaces within the 25 lens elements. It would have been obvious to someone of ordinary skill in the art at the time the invention was made to include third lens with a negative power for the purpose of allowing a greater diameter of light to pass through the lens.

Regarding claim 28, Schuster discloses a projection lens, wherein a most object forward lens element has a strong positive refractive power (section 0024).

Regarding claim 29, Omura discloses, in figure 2, a projection lens having an object plane (A) and an image plane (O) and comprising objectwise to imagewise: a first lens group (G2) formed of at least four lens elements (L6-L8 and L10) having a negative refractive power (section 0025) and defining a secondary waist (indent including L17 and L18) of the projection lens; an intermediate lens group (G3) having a negative refractive power and defining a primary waist (indent including L26 and L27) of the projection lens except for wherein the six most object forward lens elements are free of aspheric convex surfaces. Schuster discloses the six most object forward lens elements are free of aspheric convex surfaces for allowing a greater diameter of light to pass through the lens (section 0024). Therefore it would have been obvious to someone of ordinary skill in the art at the time the invention was made to combine the teaching of Omura with the lens free from aspheric convex surfaces of Schuster for the purpose of allowing a greater diameter of light to pass through the lens (section 0024).

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Regarding claim 30, Regarding claim, Omura discloses a projection lens, in figure 2, having an object plane (A) and an image plane (B) and comprising objectwise to imagewise: a first lens group (G1) having negative refractive power; a second lens group (G2) having a positive refractive power; a third lens group (G3) having a negative refractive power; fourth and fifth groups (G4 and G5) having overall positive refractive power (col. 12, lines 65-67 and col. 13, lines 1-7); the projection lens having a numerical aperture of at least about 0.85 (col. 29, line 37), and wherein the projection lens has a 1 1/2 waist construction with a 1/2 waist (indent including lenses L17 and L18) being defined in the first lens group (G1) and a primary waist (indent including lenses L26 and L27) being defined in the third lens group (G3) (figure 13) (col. 32, lines 66-67 and col. 4, lines 1-4) except that it does not show a sixth lens group and wherein the fourth and fifth surfaces lens groups are free of aspheric. Schuster shows that it is known to provide a sixth lens group for maintaining a distance between the projection plane and the image plane of 1000 mm (section 0023). Therefore it would have been obvious to someone of ordinary skill in the art at the time the invention was made to combine the teaching of Omura with the sixth lens group of Schuster for the purpose of maintaining a distance between the projection plane and the image plane of 1000 mm (sections 0023 and 0024).

Allowable Subject Matter

4. Claims 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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5. The prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitations of the independent claim(s), in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in claim(s) 17-19, wherein the claimed invention comprises a projection lens having a blank mass of about 94kg and a CHL equal to about 400 nm/pm; a projection lens characterized by the equations listed in the mentioned claims, as claimed.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Suzuki et al. (6710930 B2) discloses a projection optical system for projecting and transferring a pattern on a projection original R onto a photosensitive substrate.

Wagner et al. (US 2003/0086183 A1) discloses a projection exposure apparatus for microlithography at a wavelength of less than 200 nm.

Takanashi (US 2003/0137745 A1) discloses a projection optical system having a large numerical aperture in which the maximum effective diameter of lens of the optical system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brandi N Thomas whose telephone number is 571-272-2341.

The examiner can normally be reached on 8-5.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BNT

BNT
April 20, 2004


Georgia Epps
Supervisory Patent Examiner
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